A Decisive Test for the Theory of Relativity

Story of the adventures of a freelance researcher in achieving a direct test for the light's speed constancy, and in trying that the test is carried out.

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Introduction

Searching for a direct and conclusive proof

Studying Industrial Engineering at the University of Buenos Aires, one of the subjects I had to study in the third year was Mechanics, the mathematical structure of Physics, or mathematical Physics: Kinematics, Dynamics, etc. .A chapter of this matter was Relativistic Mechanics. It was exposed, at first, the Special Theory of Relativity of Einstein, following after the General Theory.
My refusal was immediate: I could not assimilate his second postulate -but mainly, which establishes the constancy of the speed of light for any inertial frame of reference, regardless of the state of motion between them.
That was the beginning of what I am calling my fifty years "struggle" (passed the first years of the 1960s), and that in the first times were the search of a natural fact or an experiment to corroborate this postulate that I found unnatural, illogical, out of the rational frame in which all sciences, Physics mainly, had developed.
Well then, I did not find such fact -at least, a decisive one- neither in the origins of the theory neither in the events related with it that were taking place later. What I did perceive was a wild hypothesis with which were reconciled the validity of Maxwell's equations of electromagnetism in motion systems and the Lorentz transformations, on the one hand, and on the other, the null and surprising result of the experiment that Michelson and Morley conducted to demonstrate the existence of Ether-seat of the alleged immaterial medium of light and electromagnetism in general, on whose existence is based these equations.
In spite of the generalized rejection that it also produced in its beginnings, the theory was being accepted through the concordance of natural and experimental phenomena with the foreseen results by the application of the formulas obtained in its development: the bending of light rays from a star as it passes near a large mass as the Sun, the deviation of the trajectory of charged particles in the cyclotron in respect of its theoretical path when their velocities are close to that of light, the energy release in an atomic explosion, etc.. etc..
And this is not enough? -Well, I do not understand that. Of course this agreement is required for the verification of any theory, but not enough: it is also necessary to complete acceptance of such a theory, also verify their hypothesis, since the same results could be obtained with other hypotheses, ie with another theory.
An example of this statement for the present case constitutes Emissive's Electromagnetic Theory of W. Ritz ("Oeuvres" Gauthier-Villars, Paris, 1911), that how well explains electromagnetic phenomena of moving particles within the logic of Galilean relativity; and also –let me mention it- an own theory that I included in my article "An Astronomical Test for the Second Postulate of the Special Theory of Relativity", published in APEIRON in April 2005 Doc4

(in Doc3 Spanish version), that I called "of the mobile fields ", that I now summarize postulating that *the force acting on a moving particle depends not only on the natures of the field and the particle but also on the relative velocity of this particle to the field, or, in another words ,on the difference of velocities of the field propagation and the particle motion; as well, that the field produced by a determined element comes together with the motion of such element, in absolute form in the vacuum, and, in a determined material means, proportionally to the permeability of this medium to the produced field*. The mathematical development of this theory –which I did not make- would result in similar formulas to the ones of Relativity where the velocities of the field, c, and the particle, v, are linked.

In that publication, whose main purpose is to carry out a test for the postulate in question, based on systematic observations of stars with different radial velocities, I also do a critical analysis of the Theory of Relativity (TR), and list the facts that Einstein took for its development, and the foundations of renowned professors and physicists to distort them as well as my own.
But this publication, together with a later, "A Test in the Outer Space for the Constancy of the Velocity of Light", also in APEIRON, Doc5 in July 2010, and subsequent correspondence trying to convince some observatory on its realization, is the last stage of my "struggle", and I want to expose on this site the steps I was giving to come finally to the conclusions exposed in them, from my stumble to the theory. (And I say that right: my "stumble", since I didn't look for it but I had to study it for being a part of the program of my studies).

It is my intention, then, go on exposing in it the ideas I was having and the facts that took place in relation to them -a common thread in my life, that crossed my activities of student, professional, executive in multinational enterprises, and of a small industrial entrepreneur, hoping to interest someone with the means to carry out the test of the first publication. Someone who considers useful for Science and Philosophy not to leave without full confirmation a theory of so many implications in both disciplines, for its conception of the universe at odds with the patterns of our reason and common sense: a theory that upset the epistemology itself.
I'm not a mathematician, and, therefore, I will not deploy in this exposition complex mathematical developments. My approach is conceptual, appealing to elementary mathematics an engineer has to refine his ideas. In case of being carried this test out, a positive result, apart from the impact it would have on the scientific world, would surely make some mathematical-physicist be interested in properly express my theory "of the mobile fields. On the other hand, a negative result would give the RT unquestionable experimental backing. I know that the relativists say it always had, that it already has this support. Well, in any case, it would swell the ranks of them with who are not yet there.
It is worth noting, finally, what Einstein himself says about the verification of this principle, in his book "The Physics, Adventure of Thought" (Einstein-Infeld, Losada, Buenos Aires 1939), Chapter Ether and Movement:

> "There is not the minor doubt on the clarity of this verdict, even though it is obtained by rather indirect experiences because of grave technical difficulties caused by the enormous velocity of light. *The velocity of light is, always, the same in all the coordinate systems, independently of if the source moves, or not, and of how it moves.*"

As we see, he recognizes the fact of the non-existence of direct evidence. The mentioned indirect experiences are the ones that I enumerate and question in my Apeiron's publication.

Relativity and the Reason

Always I liked Physics for its methods of observation of the natural phenomena, completely expose art and the human being's capacity for, through it, interpret them and deducing its laws. This task I find similar to the anatomist, who, by the vivisection of the human body, he discovers or deduces its functioning. The physicist deploys his wit with the observation and pondering the natural phenomena to understand the functioning of nature the body of that great being that comprises and includes all us, and who, for that reason, we can interpret, at least, in this its material concretion, understanding and describing its laws, an order that is not alien to us because our reason can assimilate and explain since it is also part of this Nature.

And this is the great physicist's contribution to humanity, because insofar as the functioning of Nature is understood, we will be able to produce advances in the technology for our benefit. And to understand it we must know its laws, and make sure that we really know them. For the present case, the RT gives us a series of formulas that allow us accurate calculations in Astronomy and in general dynamics of the high speeds. But the constancy of the speed of light in which it is based appears to us (we are several the ones who think so), if true, as an unexplainable quirk of nature, as a tyrannical boss of the universe that must be obeyed submissively, imposing regulations such as the driving on their domains with a speed limit, always inferior to itself; and warning us that, for rapid that we come closer or move away from its source, it will always reach us with the same velocity.

That's why I consider essential to pinpoint the reality or not of this pattern, regardless of the RT formulas are useful and effective.

Carl Sagan, in the beginning of his masterpiece "Cosmos" exposes his evolutionary ideas, and conceives the origin of life as a group of amino acid molecules that, under conditions that were favorable, replicated themselves to form mega DNA molecules: *the first steps of the universe*, he says, *to have self-awareness*. Whatever the real genesis, there are probably no doubts that this awareness can only be fully in humans, at the top of this evolution, with an essential tool that characterize them to advance in this evolution: reason. There is much that we could say about it and its relation to the achievement of this awareness but I would the purpose of this page.

But I do want to say here that I consider reason as our greatest gift, our best guide and guardian to move from awareness of ourselves into the Universal Consciousness, the ultimate goal of Sagan’s DNA molecule. When Religion abandons it falls into fanaticism, and if it is Science which abandons it, produces paradigms and its stagnation.

As you can see, my position is more like that of a philosopher defender of reason than that of a physicist. Anyway, apart of being neither one nor the other-beyond semantics, let us note that in European universities still early last century, Physics was taught in the faculties of Philosophy.

When Einstein was questioned, soon after published his Special Theory of Relativity, how unreasonable it appeared their 2nd principle, the constancy of the speed of light (in his early work, 1905-A. Einstein, Ann. Physik 17, 891 - he admits this fact, saying that "at first glance is completely irreconcilable with the first"), simply said something like, "After all, the reason is simply the set of prejudices accumulated since our adolescence". On the significance that it

has for me no wonder I was annoyed to read this. Could a scientist so lightly denigrate this quality of intellect, which the human being used from the beginning for his development as such?

Relativists "more Catholic than the Pope" try overcome this obstacle with the argument that it is not easy "catch" the relativistic concept, that it requires some mental adjustment that can be given over time, a kind of intellectual osmosis or a momentary flash of the "subtle" idea then will go on consolidating.

I confess that I have tried both ways but cannot get any results. All I see is what I said at the beginning: the observed phenomena fit beautifully with the expected ones, and this has been validating the theory, beyond we like it or not. Many scientists use its formulas in their calculations, and, as they work, why bother if they do not find reasonable the theory or, simply, do not understand it, if, on the other hand, many others do understand or it seems to them that they do understand it?

But in the human-universe relation appears the great difficulty, perhaps the watershed of the relativistic and non relativistic concept (can I say it's a matter *of empiricism* versus *rationalism*?); to Einstein, the actual geometry is different from the Euclidean, ie one thing are the forms imagined by our mind, and other one the real forms of material bodies in the universe. What we say, the traditional reason, or classical physics, defenders, is that geometry defines the model, the pattern, and material objects differ from it for reasons that we can know and ponder, deducing so what the actual shapes of things are.

A simple example: a beam of any material, supported at its ends at the terrestrial surface will never be straight, although we had designed it so, because its weight will bend it even in an infinitesimal amount. But we are not going to say from this that in the world there is no the straight line. It will suffice to place in orbit the beam to recover its straight design, freed of its weight.

Einstein would say that the beam cannot be right because the mass of the curved Earth the space in your proximities. And we would reply to you than placing another hold on your midpoint, aligned with the other ones two, the beam returns to be right (strictly speaking, with two minor curvatures), in spite of this supposed curvature of the space.

Einstein would say that the beam cannot be straight because the mass of the Earth warps space in its vicinity. And we would reply that placing another support at its midpoint, aligned with the other two, the beam becomes straight (in fact, with two lower curves), despite the supposed curvature of space.

I finish off this point making it clear that I do not say that relativists deny reason but that they argue that admitting the principle of the speed of light constancy is opening it to an unexpected reality in classical physics, and adapt it to the actual functioning of the universe, abandoning its ancient logical mechanisms that are only those “prejudices” so defined by Einstein.

Despite I resist accepting that the evolution of science became with a deficient reason, scientific and researching my spirit tells me that we must leave open the door to this

possibility, although my common sense rejects it, and the result of my quest of 50 years is that this principle was never directly proved. And this my task I think was not in vain, because, in addition to an alternative theory to Relativity, I am proposing to the scientific world two test that definitely they would, settling out this issue. My “fight” has been, and is, to convince those who can carry them out to do so.

Summary

I start, then, this page with this "introduction" to continue then with segments such as "The Passage Along Faculty" with the analysis of the principles of the RT and my questioning, and anecdotes with professors; my interventions in the "Rolex Awards for Enterprise ", with the development of several experiments that gave then rise to these interventions; and derivations of these, such as a request to CONICET of performing the experiment by its researchers, doctors Mario Garavaglia and Hector Vucetich; correspondence with NASA for the possible explanation I found of the initial malfunction of the Satellite Telescope Hubble; the development of “An Astronomical Test for the 2nd Postulate of the Special Theory of Relativity" and its presentation to Congress of Physics AFA2003; the failed attempts to its publication in the magazine Nature and in the American Journal of Physics; the mentioned 2005 and 2010 APEIRON publications; the attempts to push the performing of the test by circular letter to astronomical observatories with meridian telescope; to keep adding, if having the necessary time, quotes of passages from Einstein's publications and conferences with my comments and disagreements, and of course, all novelty taken place on this issue, and some fact that I would have been “left out."

The passage along faculty

The postulates of the Special Theory of Relativity

As I said, the matter was Mechanics and the Chapter, The Special Theory of Relativity. Let’s consider and analyze its principles as I was taught in college (in its original publication in April 1905, Einstein does not make them so laxative, but these are the concepts):

I) The laws of the physical phenomena are the same for all the referential systems in uniform translation relative to each other, not existing, therefore, any privileged referential system.

Okay, this postulate does not offer any inconvenience to reason but rather the contrary, a kind of homogeneity on the conception of the whole Universe: no matter what a vehicle in straight and uniform translation we move or in what galaxy we are, when we throw a stone it will follow a trajectory that we will be able to predetermine knowing the given impulse and the forces to which it is further subjected, such as friction with the environment, gravitational attraction, etc., etc.

II) The speed of light in vacuum is the same for all observers and independent of the state of motion of the light source and the observer in relation to the source.

Here definitely we come into conflict with reason, contradicting even the previous postulate, since it establishes a “super privileged” system: the one that takes as the centre of coordinates the luminous source. Let's see: in this system, all observers, regardless of the motions they have each to other and to the source, are fixed to the light source since the light reaches everyone with the same speed. Apart from this, -which is no small- any other system in relative motion to it appears as fixed, for the same reason as above. That is, this postulate conceives the universe with a tyrannical and **absolute** pattern, light -and, by extension, any electromagnetic field, with which no **relative** movement is possible, or at least measurable. Conceiving it so, as we shall see, any parameter in an equation involving moving systems becomes variable; if it also involves the speed of light, which will always remain the same, untouched. Given this imperturbable rigidity even the time and the space "are made of rubber." The great paradox is that the theory that postulates this pattern is called *of relativity*.

Let us see in another way more explicit and practical, perhaps, and certainly less sensationalist: If light travels at the same speed regardless of the source, we could infer that there is a medium that imposes this restriction to light, as it happens with air in the sound propagation, which gives rise to the phenomena known pitch shift, or frequency shift, in the noise of the engines in racing cars when they come (loud) and when they leave (grave).This is the well-known Doppler effect that occurs when the medium that transmits a wave is excited with a moving object towards or away from the observer. Excitation travels at the same speed but its frequency increases or decreases: therefore, the produced wave is shortened or lengthened. So, in conceiving the constancy of light speed regardless of its source, we use the idea of a medium for the propagation of light: the ether. OK.

But if the observer is moving, experience tells, in the case of sound, that the speed with which it arrives changes as so does the time it takes to reach him, and also the frequency, because he also perceives a change in the pitch of the sound as he approaches or moves away from the sound source. And this happens because the observer moves with respect to the medium, so that, while it transmits sound disturbance at a constant speed and with a wavelength always the same, intercepting waves his ear with varying speed, the frequency of these changes.

But this postulate tells us that this is not the case with light, that its speed is the same regardless of the relative motion between source and observer.

But perhaps the Doppler Effect does not appear also with light waves in these cases?

Yeah, even quantitatively answers the Doppler Effect formulas, a fact that is used, among other things, to measure velocities with the famous roadside police radar. But Einstein says to be at the source which produces the frequency shift observed in these cases. Well, of course, if I say *that the speed of light is constant*, the only way to justify the observed change of frequency is saying that it changed in the source.

So the light source in this theory also has the power to emit light at an adapted frequency to the state of motion of each observer. And this can be done simultaneously for each of them, no matter how many there are. It seems "a lot", right?

The support or discussion of this postulate always will be laborious and complicated by experiment, for such is the task of measuring potential changes in the speed of light as a result of motion between source and observer, given the huge difference in magnitude between the possible relative speeds and light speed.

In my aforementioned publication "An Astronomical Test ..." I do a detailed analysis of this problem, how the concept of the luminiferous ether became the paradigm of the nineteenth century, and printed a huge prejudice in the minds of the great physicists of the time to focus of issues related to electromagnetism: Fresnel, FitzGerald, Lorentz, Maxwell, Poincare, and even Einstein, based their arguments in this ether; and how, finally, Michelson and Morley (M-M), attempting to prove its existence with its famous rotating interferometer, and its subsequent null result, contributed decisively to the advent of the RT.

Now continue to see my collision with relativistic concepts in college:

<u>“Simultaneity” in the RT</u>

In the development of RT, attempting to set the position of a rigid body in a coordinate system moving with respect to another system, according to the time elapsed and its observation from the two systems, conceptual contradictions appear at odds with reason or common sense, that Einstein saves -or try to save- positing also the concept of a proper time for each system, to say, time is not one, absolute, to locate an event or the simultaneity of two or more events, but that concurrency, for example, may be when viewed from a system, and not be in another. And so does with distances: the spaces between two points of a rigid body vary depending on the speed that body moves from another system. FitzGerald had just anticipated this concept to explain with this argument the "failure" of the experiment of M - M. And so do after Lorentz, quantitatively even, applying its transformations, that Einstein in turn follows, assuming the constancy of the speed of light in the calculation of simple “Galilean" transformations, and do them famous for their applications in relativistic kinematics

And this happens in this theory because simultaneity is defined by observation and not by their occurrence. This is similar to say that a phenomenon occurs when one sees it, and not allow us to conceive or infer their occurrence *when actually* happens. This *reality* makes no sense in this theory, as do not have it a time out of the system in which one is, to say, unique and all, witness of all the events of the universe. When an astronomer records a phenomenon on the sun surface, well refer it to the observatory clock where he is working, but he knows that this phenomenon happened just over 8 minutes before, taking into account the distance of the sun and the speed of the signal that revealed its occurrence. However, under the reasoning of this theory, the astronomer can only say that the phenomenon happened at the time his clock sets its perception.

Being its concept of simultaneity, together with the constancy of the speed of light, the essence of the RT, I find it convenient to study in detail the example presented by Einstein himself: A train moving with a velocity v respective to the tracks, with observers on the train and by the tracks:

*The train has a length L which is the distance from the extremes of its head and its tail. By the tracks we find two observers who are beside these extremes, points A and B, and are provided with flashers that they trigger when the head and the tail of the train respectively passes by front of them. In the middle point M (AM=MB) there is a third observer with two mirrors at 45º to the visual AB, in order to see if the flashes in A and B are simultaneous. (**And this is the rule that the RT will adopt from here on to define simultaneity: two events separated by a given space are simultaneous if an observer at its midpoint observes their simultaneous occurrence**). In the middle point of the train there is a fourth observer (M´), who also has a system of mirrors to verify simultaneity of the flashes. This is a "thought experiment" and it supposes a very "long train" that can also travel at a very "high speed", and that, in some way, it has been possible to remove air all around.*

Well, imagine what will happen to the verifiers, with the train traveling at the speed v, when the head and tail of the train pass in front flashers:

The observer in M will see flashes of A and B simultaneously. But inside the train, M ', will see the flash of B (tail) that is delayed because he moves away from the flash, with the opposite occurring to A (head), as he is getting closer to this point. Therefore, now there are not simultaneous flashes to him. On the other hand, he'll say the train is longer than L = AB, as the locomotive passed by A before the tail by B.

With this simple example we can see (says Einstein) that no sense to speak of simultaneity or absolute distances when considering phenomena occurring in systems with relative motion to each other.

He concludes also that from the quantitative analysis of this "thought experiment" we can deduce the Lorentz contraction.

This example appears to be very reliable and decisive. But let's see what observations can be held:

1)The natural reasoning, in the Einstein`s times, to *assume* that the observer at M' is going to receive with delay the flash from B, and in advance the one from A, was due to the widespread belief of the existence of the **ether**, that **light propagates in the void with a constant speed "c**", and, as the points A and B are supposed fix in this mean, and he approaches with velocity "v" to A and goes away from B with the same speed, in the former case the light would arrive at the speed $c' = c+v$, and $c' = c-v$ in the second, i.e., higher and lower than c, respectively, so that, when travelling sections of equal length, the light signals would take less and more time respectively.

It is fair to say then that M' will seem that the train was lengthened (L'> L) as he perceives that its head passes by A before its tail by B. On the other hand, the observer of the tracks, M, will say that the train maintained its initial length L, as when it was stopped, as he perceives simultaneity of the flashes at A and B as before.

Convention we reverse now of fixed system and mobile system: the passenger in M' says the train is stopped and that are the tracks which move with its observer M and flashers A and B. **According to the first postulate, or principle of relativity, the result should not change**, but

this example did change things, because for M' the train varied length when moving the tracks, while for M simultaneity continues although he is moving. As it could say that for being valid the change of convention the flashers should now be on the train, let's see what happens going these to A' and B', keeping in A and B only signals in order to trigger flashers when passing in front of them:

a) Train stopped: Both tracks as the train will observe simultaneous flashes of A' and B'.

b) Moving Train: To M' the train was extended, since we are assuming that the flash moves with constant velocity in the medium from where it occurred, regardless of the movement of the flasher, but not for M still perceiving the simultaneity from A' and B', as he doesn't change his position on respect to the points where there were flashes, A and B, faced with A' and B' at the time. But if we say that the mobile system is the way, we see again that the situation is the opposite of the initial agreement to consider fixed system the tracks, and mobile the train: When is produced the relative motion the lengthens now is the fixed system (the train), either with the flashers in railways or on the train.

This lack of compliance with the principle of relativity, or its first postulated -not raised by Einstein- happens because his example is based in the -neither expressed- idea of absolute ether, and with this idea the only system that can be considered fixed is the one which is fixed at the medium of the light propagation, call it ether or whatever it is wanted..

And the remarkable thing is that this *example of the train and the tracks* summarizes what happened to the Maxwell-Hertz equations, when *imagining* its application to moving systems, designed as are the equations with the idea of stationary ether.

2) We saw then that this example does not meet the First Postulate. Let's see if we can save it by applying thereto the Second: **the constant of c for any relative motion between observer and light source:** This is equivalent to saying that for both M and M', the flash speed is the same in both sections: $c' = c'' = c$. Therefore, for equal steps times will be the same, and what will happen is the simultaneity of the flashes for M and M', both `with train at standstill as moving, and both supposed fixed the tracks or stationary the train, fulfilling also the first postulate.

But this is not the case of the example, because Einstein supposes no simultaneous perception of these flashes despite being proposing next the constancy of the speed of light in both sections (the other great contradiction of the example). And so the only way to explain this lack of simultaneity is saying that the length L of the train really varied to L' according to Lorentz Transformation:

Operating with the Galilean transformations of a fixed system of 3 coordinates, to other moving one, but imposing this *c* constancy to both systems, we reach the famous transformations, which, referred only to the abscissas *x*, as the case of the example discussed, reduces to the expression:

$$x' = \frac{x - vt}{\sqrt{1 - \frac{v^2}{c^2}}}$$

Applying this transformation to the points A' and B' (x and) , and considering that L = x_A - x_B and L' = $x'_A - x'_B$,

$$L' = - = \frac{}{\sqrt{1 -}} - \frac{}{\sqrt{1 -}} = \frac{}{\sqrt{1 -}} = \frac{}{\sqrt{1 -}} > L$$

This is the quantitative result of case 1) which, as we saw, does not meet the first postulate, because although we reverse convention fixed/mobile, the result is that the variation of L is always suffered by the train.

3) Let us assume now that **the speed of light always accompanies its source**, that it is constant only with respect to it, ie, that **it is affected** in more or in less **by the relative motion between light source and the observer:**

a) Train stopped: Both M and M' will perceive simultaneity.

b) Moving Train: M will perceive simultaneity, but not M' because the flash of A will come with advancement, and backwardness of B, as given in case 1) that *c' = c+v > c" = c-v*, then interpreting the train also lengthened.

Reversing the convention fixed/mobile we can see that the fixed system varie its length, but not the mobile one.

c) Let's put the flashers on the train, and then we will always have simultaneity in it, either considered fixed or mobile because, as we said, we are assuming that light accompanies the source movement, that flashes keep the same speed related the flashers and, therefore, also with respect to the observer.

With this conception of the propagation of light it is going to have the simultaneous perception in the system including flashers, and not simultaneous in the one that is moving in respect to them, regardless of which is considered fixed or mobile.

Then, with this understanding of light propagation, in addition to the *thought* result in the Einstein's example, it meets the first postulate of the theory. And only it happens under this conception. But curiously, this hypothesis is bypassed in his time, imbued as they were all scientists, including him, with the idea of stationary ether.

On the other hand, we can do the quantitative calculation of the **apparent increase from L to L'** without using the Lorentz transformation, and, of course, in a simpler and natural manner, and with other results:

If we define t´ as the time it takes the flash to pass through AM', and t" the one through BM', we find: t´= —— < t"= —— . For this reason the observer at M´ would suffice to move a little to the tail (the fraction ΔL) to see again the simultaneity of the flashes. In this case ΔL would prolong the AM´ segment and would shorten in the same value BM', resulting the sum of both segments the **same value: L´= L.**

We can easily calculate ΔL expression. To this end, we propose the equation of simultaneity: t '= t ", that is, $\frac{\frac{L}{2}+\Delta L}{c+v} = \frac{\frac{L}{2}-\Delta L}{c-v}$. Solving, we have $\Delta L = \frac{Lv}{2c}$

L 'is, then, only an **apparent enlargement** due to the displaced perception of the flashes, equal to the sum of both shifts ΔL :

$$L' = L + 2\Delta L = L + Lv/c = L\,(1 + v/c)$$

4) Thus, according to the criteria by that is *supposed* occurs propagation of light, you can *imagine* different results in this experiment. In favor of the criterion of the point 3), which considers the source communicates its speed to the light, we have all the experiences of everyday life, in which there are not variations of electromagnetic signals recorded with differences of 12 hours, in which we move with opposite velocities of about 30 km/sec related to a given star, due to the daily rotation of our world and its movement around the sun. (See my proposals to test the existence of the ether in Scan6, scan7, scan10 and Scan15).

And if it is argued that the phenomena of everyday life do not use precision instruments to demonstrate the possible variations of these signals, I reply that the great evidence was provided by the results of the experiment of M-M for the verification of the existence of the ether. Since, under this hypothesis, the result is null, the first consequence of this experiment is that such medium doesn't exist, but, if any, the light increases or decreases its speed in it as the light source moves in the same direction or in the contrary, respectively.

But I I want also point out this: Despite it is true that with *c* constant M-M experiment can only result in a negative, this negative result does not imply that *c* is constant, that the 2nd postulate of RT is valid, for the simple reason that this assumption was not tested in the experiment, since there is no relative motion between source and observer: throughout its development both are on the same system -and fixed on it- at the wheel of concrete, support of the interferometer, the light source and the detector telescope. And, of course, to our planet, whose movement it was trying to evidence.

But Einstein did not abandon the idea of ether, and the proof of their stay in this concept is the example of the train and the tracks, and the recurrence of the idea of Lorentz length variation that arises when considering the motion of a solid in a medium in which the speed of light is always *c*. And how he arrives to this conclusion becomes clear when exposing this example in his book "Relativity: The Special and Genertal Theory" (Methuen & Co. Ltd., 1916), arguing that, despite appearing as intuitively correct the conception of *c* joined to its source, the facts show that it is not so, quoting astronomer De Sitter argument with the observation of binary stars (see the chapter "the Apparent Incompatibility of the Law of Propagation of Light with The Principle of Relativity"). This argument was detracted *a posteriori* by Struve, and exposed, along with many other phenomena emissive by J. G. Fox. I appealed to all these references in detail in my work, "Un Test Astronómico..." (Doc3) and in my publication "An Astronomical Test ..." (see p. 236 in Doc4).

5) As a curiosity in the way of reasoning in this example of the train, let's see what we would find using the shots of pistols as signs of its head and tail passages by the observers in the tracks, not being possible for some reason the display of flashes. The alternative is valid and

meets the same structure of reasoning: We establish the simultaneity of two events if the signals of their occurrence reach the midpoint of such events simultaneously.

Observemos que la mecánica de la transmisión es la misma: una señal (el sonido) que viaja en su medio (el aire) con velocidad constante. Se repetirán todas las suposiciones: El observador en las vías, M, percibirá la simultaneidad, y no así el del tren, M', que percibirá que el sonido del disparo de A le llega antes que el de B, y asumirá que el tren se alargó de L a L'. Note that the mechanics of the transmission is the same: a signal (sound) traveling in its medium (air) with constant speed. It repeats all the assumptions: The observer on the tracks, M, will perceive simultaneity, and not the one of the train, M', who will perceive that the sound of the firing of A will arrive earlier than the one of B, and will assume that the train was extended from L to L'.

Now comes the reasoning of the example: impose as a postulate that the speed of sound *s* is constant and that despite this, M' perceive the shot of A before that the one of B, and then we come to the Lorentz transformation in the case of sound signals. Note that instead of *c* appears *s*:

$$L' = \frac{L}{\sqrt{1-\frac{v^2}{s^2}}}$$

And this equation tells us that the train will never reach the speed of sound because, in that case, its length would be infinite. And this is the same conclusion that Einstein comes with light. But we know that the speed of sound can not only be achieved but surpassed, by bullets and aircrafts. I want to point again that the reasoning with this last example is exactly the same as that taken by Einstein, that the only difference lays in the order of magnitudes of the speed signals used to **observe** the events.

6) Veamos ahora un ejemplo simple y cotidiano: En una tormenta eléctrica, un rayo y su trueno son *simultáneos* en los alrededores de donde cayó, pero a medida que nos alejemos de ese lugar vamos a encontrar un desfasaje mayor entre uno y otro, por la diferente velocidad con que viaja la luz que transmite el rayo, y el sonido que transmite el trueno. Podemos imaginar cuán dificultosa sería la tarea de establecer la simultaneidad de ambos fenómenos para el caso de producirse en dos sistemas con movimiento relativo entre ambos.

6) Let's now see a simple, day to day life example: In a thunderstorm, lightning and thunder occur simultaneously around where it fell, but as we move away from that place we will find a greater phase shift between the two, for the different speed at which light travels transmitting the ray, and the sound that transmitted thunder. We can imagine how difficult it would be the task of establishing the simultaneity of both phenomena for the case of their occurrence in two systems in relative motion between them.

In short, the imagined experiment of the train goes to say that the **observation of simultaneity** in relative motion systems **is only possible with instant transmission (infinite speed)** of events. And for nothing else more. All other conclusion of parameter variations will be only the fruit of speculation, since such variations will depend on the assumptions we do with the form and speed of respective signals transmission.

7) Of course, the scientist, in the data processing of certain phenomenon or experiment, will always work with the observed values of the parameters involved, but he will make the necessary corrections to these observations, in the circumstances of the case, for to know the real values with a calculated precision.

When I look at the distance a horse, by effect of perspective, surely I'll see it smaller than the dog at my feet. But I won't say that, because of the distance, the horse shrank but that *I see* it smaller. This, that it is obvious, does not occur in the RT: On the train thought experiment, applies the formula of the Lorentz transformation to calculate what the *actual variation* of its length suffered the train moving on the tracks.

And so does with the other major parameter: time, which makes it proper of each system, depending on the speed of the system. In this example, if we wanted to know how lasted the cigarette smoked by passenger in M' (t'), compared to the one smoked by the observer M in the tracks (t), we have to apply the Lorentz transformation to the parameter time : t

t' = $\frac{t-\frac{vx}{c^2}}{\sqrt{1-\frac{v^2}{c^2}}}$ As we see, time suffered a contraction, since $\sqrt{1-\frac{v^2}{c^2}} \approx 1$, and

- t - $\frac{vx}{c^2}$ < t . Therefore, t' < t .

Needless to say, we have assumed equal duration cigarettes under normal conditions, ie smoked in the same system.

And this is undoubtedly another major challenge to the reason for the RT: What is the meaning of these transformations? Are only *measured* values from the other system the ones shown in the transformations or are the ones that *actually suffer* the parameters in a system in motion?

When FitzGerald and Lorentz justify the M-M null result, saying it is due to a shrinking of the interferometer arm parallel to the displacement thereof with respect to the ether, are talking about a *real contraction*, and nothing else. And Einstein concludes exposure of his "thought experiment" of the train and the tracks, as we saw; saying that from it can derive the Lorentz contraction. And in his writings mentioned in point 4) he makes it clear that to remove the apparent incompatibility between the postulates of his RT we have to abandon the idea of the classical mechanics of lengths and times values independent of the movement of the system in which they are.

<u>The speed of light: limit speed</u>

This is another objection I did, and do, to the Einstein's theory derivations, in this case, in the relativistic dynamics:
As it is known, this theory predicts an increase of the mass *m* of a particle in motion with relative velocity *v*, given by the formula:

$$m = \frac{m_0}{\sqrt{1-{v^2}/{c^2}}}$$

where m_0 is the mass of the particle at rest.

As we can see, with increasing *v* the same applies *m*, and the case that it would equalize *c*, *m* would take infinite value, which makes no sense, and even less for the case of exceed *c*, since the denominator of the formula would have imaginary numbers (square root of negative numbers).
This absurd result leads to an absurd consequence also:

The speed of light, apart of being a universal constant for Relativity is a limit to any material point, ie no material particle can move at a greater speed than the speed of light, regardless of the inertial system from which measure.

I'll put an imaginary example to base my objection to this concept:

A spacecraft is traveling through intergalactic space, practically free of any gravitational influence, since the nearest star is light years ahead of the craft. We do not care how, but it is there, in a state of motion that only makes sense if we refer to a particular star, our sun suppose. Well, it is moving away from the Sun at a speed of 300 km/sec. Suppose also that its trajectory remains in the plane of Earth's orbit. A consequence of this, as the Earth orbits the Sun at a tangential velocity of 30 km/s, at a given time, the speed related to our planet will be 270 km/sec, and 6 months later, 330 km/sec .

The craft's captain decides to travel faster to his destination and lights reaction rockets, which after a certain time impel the craft at 400 km/sec with respect to our Sun. Successive impulses of their engines the craft has been increasing its speed, and it is close to the light's, a little less than its 300,000 km/sec. What will happen now with the ship, which cannot travel at more than 300,000 km/s with respect to the Earth? Will it begin to circle, copying its orbital motion, so as not to exceed this speed? Or if we consider the phenomenon from our planet, Earth will remain stationary when the ship reaches the speed limit, to not exceed this speed relative to the ship?

This concept of l**i**mit speed due to the increase in mass with velocity, is due to the great paradox in Relativity to inadvertently base their reasoning on the idea of an absolute frame of reference: *"I cannot give more pulses to a high speed body because its mass increases and, consequently, greater inertia will prevent that body can take more speed "*
See if not, what Paul Couderc, an accredited and prestigious scientific author, thinks about, in the section "La Velocidad de la Luz, Velocidad Límite " of Chapter II of his book "Relatividad" (EUDEBA, Buenos Aires, 1963):
"…"
"The idea of infinite speed, which some considered absurd, has been replaced by the speed "limit one. Actually, classical mechanics has accustomed us to add speed, and arithmetic does "not impose any limits on the possibility of successive additions. When a ball rolls we can give "an extra boost with the foot and increase its speed.
"Why this operation would not be theoretically possible if the ball has already the speed of "light?
"First of all, Relativity considers false velocity addition law. On the other hand, establishes that "the inertia increases with its speed: its mass can become big enough so that our impulses lack "practical effect on it.
"…"

But the point is that **the speed is always relative** to the observer who is in a given reference point, which, moreover, can be going away at high speed from the body in question, and that,

therefore, has no way to prevent it takes any impulse although its being away happens at the speed of light, or any other close to it.
In the Couderc's example let's take a football player who is about to take a free kick. The game is *being observed* by the crew of our spaceship that is receding from the player at a speed close to that of light. Will this fact prevent the player may kick the ball or that it does not move by its great mass, breaking his foot? Or did the player also acquire an enormous mass to get away from the ship at high speed, thus overcoming the lower relative mass of the ball?
In any case, what probably it'll happen is that since the ship it cannot watch this game because the TV signal cannot reach it because is moving away with at almost the same speed as it is issued, and was far away when the game started. This is my opinion, but for relativists the game yes can be seen, although with severe distortions due to the downward of its frequency, since the signal always come to the ship with the same speed *c*. What we don't know is how they solve the issue of almost infinite mass of the ball (and of the whole set: players, public, court, etc..).

Absurdities of this type occur in many sections of the RT, as appearing in the treatment of "relative time", such the famous paradox of Langevin's twins travelers, which, since fed up treated, I will not include here.

Anecdotes with teachers

The exposed above contains the questions emerging when studying the RT, which at that time I had not developed as thoroughly as I did now. But certainly, in contact with teachers or heads of practical work were exchange of opinions and diverse positions of them about it. I clearly remember two stories that I want to include on this page. The first one is with Dr. Jorge Staricco, Titular Professor of Mechanics.

Dr. Staricco was a great educationist and renowned scientist, among other charges, Director of the Department of Science of the recently formed ALALC (early 60s). His lectures were so interesting and entertaining that always turned massive. That's why he exposed them in the auditorium of the Faculty (Paseo Colón 850), being the classroom of larger capacity.

Well, in occasion *t*o attend one of them, while he was expounding on the issues discussed in the previous section, I raised my hand to ask a question. He interrupted his exposition and said something like "wait is over, please, I'm tired of being interrupted when I get to this point, because of the proliferation of science fiction novels that lit your heads." Completed the point (something to do with proper times of each system), invited me to speak.
- "Excuse me, Professor, I don't understand how to differentiate the real time elapsed by an event from its measurement." (Something like that, too, of course).
Dr. Staricco remained silent for a while, with his hand on his chin in serious contemplation, after which only managed to mutter "yes ... yes ... yes ..."
- "Excuse me you, sir, if I was a bit rude. I told you that most of the times questions come from novels. But your question is very wise.""Excuse me you, sir, if I was a bit rude. I told you that most of the times questions come from novels. But your question is very wise."

He never answered the question, and that in itself I considered a response, especially by the respectful tone of his subsequent treatment.

The other story was with Dr. Gorzio (I cannot remember her name), Chief of Practical Works of Physics III (Atomic Physics).
We were analyzing the behavior of a particle of mass *m* and charge *q* in the Lawrence's cyclotron: The angular speed in it is given by the formula

$$\omega = K \cdot \frac{q}{m}$$

where K is a constant that depends on the applied electric and magnetic fields which acting alternately and synchronously, and increasing the frequency of this alternation, the particle is accelerated.
The issue here is that much increasing the tangential velocity $v = \omega \cdot r$ (*r* is the orbital radius of the particle), and approaching it to the speed of light, we find that ω decreases, thus losing its synchronism with the applied alternating field. (A consequence of this is the development, a posteriori, of the synchrocyclotron, which automatically resynchronizes this alternation).

Well, this decrease of ω is another boost to RT: since q is constant, the *only* explanation for this is that, with increasing speed v, m increased.
Here came my reply: Why do we have to say that q is constant and m variable? Couldn't it happen in reverse: that increasing v decrease q and m remain constant, or both at once: increasing m and decreasing q ? Couldn't it be that both q and m are manifestations of the forces acting on a particle in electric, magnetic, gravitational, etc. fields., and functions of the ratio of speeds of the particle with the one of propagation of these fields?
(This concept is widely developed much later in my theory "of the moving fields" exposed as an alternative to the RT in my publication "An Astronomical Test ...", page 239. Doc4).
The teacher thought for a while, after which, she said: "Certainly, it could be just like that."
Finishing the class added: "What you are proposing is much more reasonable than what was stated in the RT. -Schulz, promise me you will never leave this.
(-Doctor Gorzio: I listened to you. I did not spent all the time I would have wanted but never left the issue Thanks for your support and encouragement.).

My interventions in the Rolex Awards for Enterprise (RAE)

Experiments development

Finished the Faculty, working as an engineer, always the subject of RT occupied a sector of my mind. So, sometimes I turned to it for consultations at its library or archive. I had imagined initially an experiment, which I can't remember well now, based on Fresnel mirrors and in his theory of partial ether drag. With the scheme in hand I went to consult to Engineer Ernesto Galloni (co-author with Dr. José Fernández of Elemental Physics book, widely used in high schools and universities), then Head of the Physics Department of the Faculty of engineering at the University of Buenos Aires.
Very kindly received me and, considering my proposal very similar, directed me to the experiment of W. Kantor (J.Opt.Soc.Am. 52 (1962) 978). Reading this publication I found unknown scientific journals, and by its references, many other published experiments.

I was always looking for an experiment that conclusively proved the 2nd postulate. But there was no case. I didn't find it, even though their authors considered them conclusive. I saw that all depended on the interpretation given to the phenomenon of interference in a light beam and to the Doppler Effect. ((Thus we see how, with similar experiments, W. Kantor (supra) and

Q. Majorana (Phys. Rev.11, 411 (1918); Phil.Mag.37, 145 (1919) reach opposite conclusions)). Or, on the other hand, based on the experimental verification of foreseen phenomena when using the formulas developed in the RT, which, as I said above, we could obtain under different hypothesis.

First intervention

Eventually I came up with an experiment that went directly to the attempt of separation of two light rays with possible different speeds, subjecting them to reflection in a high-speed rotating mirror, a similar scheme to that used by Foucault in his successful method for determining the speed of light The difference was that instead of the light from one source, it used two ones, those becoming from the Sun and the Moon, whose images are overlaid on a glass plate fixed to the earth's surface, at dawn or dusk of a full moon day. If this is done at dawn, sunlight would cross the plate with speed $c + v$, where v is the tangential velocity of the earth's surface, while the moon is reflected with velocity c -v.

The year was 1977, and I happened to try to make to know this proposal of experiment, sending it to the contest “The Rolex Awards for Enterprise ", whose existence I learned from an ad in a magazine, in the" Applied Science and Invention " categorie. In Scan1 you can see the form used. This did not reach the destination before the closing date of the competition (31 March 1977), so in fact it was only an attempt to intervene.

I want to highlight here my gratitude to the late Dr. Otto Schneider, a geophysicist at the Earth's magnetic field specialist, author of numerous research papers in this field, Professor Emeritus of the Faculty of Sciences of the UBA (Buenos Aires University) and CONICET (National Council of Scientific and Technical Research) Principal Investigator, and member of several national and international scientific societies. We have a paternal/filial friendship long before these, my "deliriums". It was he who translated to English (official language of the RAE) this series of 3 works, and suggested some modifications for better understanding.
He also approached me related publications discussing the RT. That was how I learned of the works of Silvertooth and Aspden that led to my third presentation. It was also he who introduced me to Dr. Mario Garavaglia, one of the greatest authorities (probably the greatest) in the country on lasers, Professor of Physics at the National University of La Plata, Superior Researcher of CONICET, Director (at that time) of the Center for Optical Research (Ciop), part of the University of La Plata, and also the author of numerous researches and publications in the field of optics. With all this support and collaboration, Dr. Schneider never commented on my questionings, because -in his words-not have been interested in the study of RT.

Second Intervention

These contests were held every four years, so I waited to the next (1981) to try to carry out my failed presentation.
But in these years I thought in new variants to add to the original project, highlighting, besides. the concept of the experiment, summarizing in this scheme:

a) Selection of two light sources of different speeds whose rays are possible to make impact on the following element:
b) A resolution mechanism capable of separating the beams from each of the sources
c) A detection element of the eventual produced separation.

This scheme would add new light sources, mechanisms for resolution and detection, greatly expanding the possibilities of the experiment, as indeed happened with the contribution made to it by Dr. Garavaglia.

I went to see him with my project to the CIOp's headquarters in Gonnet (La Plata). This consisted of three experiments within the described scheme (Scan2), which maintained the elements b) (Foucault rotating mirror) and c) (high-resolution telescope), but taking as light sources:

1) The Sun and the Moon, such as described in the failed first intervention.
2) A visual double star conveniently chosen, and
3) A laser beam divided by a glass window into two rays -passing through one and reflected the other -traveling one in the direction of rotation, and the other, on the contrary, in a rotor with mirrors on its periphery so as to produce multiple reflections to another battery of fixed mirrors conveniently located outside the rotor, similar to the experiment of Q. Majorana assembly (Phys. Rev.11, 411 (1918).Thus, a beam speed would be diminished, and the other increased by the tangential velocity of the rotor, and in many times as the reflections produced in its sector of the rotor.

Received me very kindly Dr. Garavaglia, and we were analyzing details and theoretical concepts for long hours (I think it was more than a day we met). Although he did not share my expectations with the outcome of the experiment (expected it to be negative, ie, would validate the RT), he was enthusiastic about it, saying it would be the first time that RT would be tested in the southern hemisphere, to the point that offered CIOp facilities for completion, and so he informed the RAE Scan3.
Also, as I said above, he added a fourth experiment on the same scheme: "An Optical Wheatstone Bridge", which uses a micropulses laser, or pico-laser, whose beam is also separated by a half mirror into two beams that, after traveling different paths, are joined in a photoelectric cell that will produce flash in the place where both micropulses are crossed, place registered for graduate photo detector.

We see that this is similar to the third of my experiments scheme, but with a completely different assembly, replacing the laser by one of micropulses, the Foucault rotating mirror by a photocell, and the telescope detector by a photo detector.

I was unaware of this device, the "optical Wheatstone bridge", and consider it very interesting and accurate. Surely not enough I highlighted the contribution of Dr. Garavaglia to my presentation (I mentioned only at the end of it-Section 5: Additional Information), as it was emphasized in the referred letter to RAE, also setting his position on RT (there was also clarified this in the Section 5, and so I let him know when receiving a copy of the letter).

Attempts of publishing in PHYSICS TODAY and in CIENCIA HOY, and Third Intervention

During the 80s I had lots of movement in my private activity, so I stayed a little away (in facts, never mentally) of RT. It was at this time that I realized that my projected experiments were also reached by the inconvenience postulated by J.G.Fox in their papers of the 60s, the scatter of light in the material mediums, papers that were also included as references and attachments in this presentation. So, I was imagining how to perform these experiments in a

free of air medium, and how to replace the "wheel of Majorana" by some other device, because such mirrors wouldn't add neither the speeds of the laser beams nor the ones of the peak -laser, of Dr. Garavaglia.

In these ponderings I was when finishing the decade Dr. Schneider gave me copies of the letters of H. Aspden to Physics Today of March 1988 Scan4, and E. W. Silvertooth to Nature, August 1986 (referenced in the larer) Scan5 where are questioning the generalized interpretations of the negative result of the famous Michelson-Morley experiment in 1887/1888, suggesting that this negative result may well be due to a resonance phenomenon in the nodes of light waves in the reflection process at 180 ° in the interferometer mirrors and crystals used in this experiment. It is suggested in these notes that this experiment should be repeated under different conditions, and imagine other ones, considering the great importance of this issue in the validity of the RT. They also suggest that this would be a good way to celebrate the centenary of the famous experiment M-M.

Here I was raised a new challenge. Before of continuing with the improvements of the designed experiments should be performed another one to establish without these doubts the existence or not of the famous ether. And I came up such an experiment. The idea is simple: I throw a laser beam on the North-South direction, and as the Earth is transversely moving at this direction in its translation around the Sun, this beam will be subjected to the dreamed (by Michelson) ether wind, so such that, if there be such wind, it will displace it from its theoretical route, and in a not small amount, such as 10 cm per kilometer of travel.This amount arises, of course, from the speeds ratio of the light and the tangential one of Earth in its orbit. Simplifying: 300,000 km/sec for light, and 30 km/sec for Earth.

To record this difference simply dial the impact of laser at 12 noon in a certain place, and then compare this point with the impact produced by the same laser at 12 hours p.m... The noon impact will be moved 10 cm to the east, and the midnight one, 10 cm westward. So the difference between the two impacts is the amazing size of 20 cm. We see that the realization of this experiment is extremely simple and yields an extremely sensitive result. But the question of possible air entrainment, the partial one of the ether, as Fresnel, the extinction length of Ewald and Oseen, etc, etc appears.

Well, then I do the laser shot inside a vacuum tube, and ready. And with a tube 100 meters long yet I have a nothing negligible impacts difference of 2 cm. And if you want to make it more compact, I do reflect the laser beam n times in two mirrors perpendicular to the north-south direction, shortening the tube all you want. This arrangement wouldn't produces the inconvenient suggested by Aspden and Silvertooth because mirrors are displacing transversely to the incident and reflected light waves.
Furthermore, with appropriate additions, it can turn into a wonderful space browser, so simple and accurate. This idea led me to apply for a patent in January 1989. In the specification of the patent can view the details of this browser Doc1. All this, of course, in case ether to be a reality, which I was discarding with the successful operation of the Satellite Telescope Huble, as discussed below. And so much it was that I didn't attend the citation of Patent Office, January 1993, leaving it accordingly as shown in the correspondent documentation Doc2.

But prior to this, I send the proposed experiment (9,12,88) to the PHYSICS TODAY magazine Scan6, (attached in Spanish in Scan7) asking her editor Gloria B. Lubkin for its publication in the "Letters" section, the same one that published Aspden note. Quickly get an answer (13/12/88) acknowledging receipt and communicating that the proposal will be analyzed. On

February ’89 I personally visited them in New York, taking advantage of a holiday trip with family by USA. Finally, on 28/06/89, they respond with the negative of publication Scan8.

I make another attempt in the argentine magazine CIENCIA HOY, which I send request for publication in January 3, 1990, also receiving the refusal of her editor Olga Dragún in April 5, 1990, along with the negative report of the referee, basing that decision Scan9.

And here comes my third submission for RAE 1993 Scan10, dated January 29, 1992, proving again luck in this contest

Derivations of the RAE Presentations

From 2nd: Talk at the Asociación Amigos del Suelo (Soil Friends Association)

Not sure why prurius, I did the 2nd intervention under the pseudonym of "Hans Haridas", and a while later I found out I had been pre-selected for the award, by a letter received from the Asociación Amigos del Suelo (Friends of Soil Association) Scan11 in which they invited me to present the issue in a meeting to honor the Argentines pre-selected from this competition, that year and the previous event. I fulfilled the attendance and exposure.

From 3rd: Request for funds to CONICET for carrying out the project

When asked again to Dr. Garavaglia his sponsorship (one of the contest requirements) for my 3rd intervention in the RAE, and receiving he copy of the project, it was such his enthusiasm that, apart of congratulating me on the idea, asked permission to carry it out under the auspices of CONICET.

I vividly remember the phone conversation in which he said it was "awesome" (sic), a much more simple and direct experiment than the famous one of Michelson and Morley of 1887/88, and that he did not understand how it hadn’t occurred to them this scheme (although there was not the laser at that time, they could have used a suitable collimator instead to concentrate light on a distant point).
Of course I accepted (if finally found a favorable echo to test my idea). Soon I received by mail a copy of the application form for funds to CONICET, dated April 29, 1992, Scan12. In it we can see that Dr. Héctor Vucetich, one of the highest authorities in Argentina on Relativity (as told me Dr. Garavaglia), shares the application, and that makes me join the working team together with other professionals of Physics . Dr. Garavaglia declined to inform to the RAE this intention so as not to interfere with the decision of the jury.

I never knew the course of this application. I thought if approved, I would be communicated. Eventually I got distracted. I do not know. I think it is now too late to make inquiries, especially for an experiment which I have no expectation of a positive result.

From 3rd: Possible explanation of the Hubble Satellite Telescope (HST) malfunctioning. Correspondence with NASA

It was in those days that I thought that if the ether was a reality-although I did not believe in this possibility, this could explain the blurred images that were providing the HST, released two years earlier (April 1990). The satellite circles the Earth at about 600 km height, so that the entire optical system is in an almost absolute vacuum, much more effective than which we could get in a lab here, on our soil. This, together with the fact of constantly rotating (completes its orbit in 96 minutes), means that the light rays that produce their images are subject to continuous and changing "ether winds" that could displace, also continuously, the point of focus , so as to make impossible proper focusing.

I made to know to NASA this possibility with a letter to the General Manager at its headquarters in Washington (USA), dated 14/07/92, along with copies of the forms and attachments of my 3rd presentation Scan13. About two months later I received response in a bulky envelope containing a letter, dated 25/08/92, from the Associated Administrator for Space Science and Applications, L. A. Fisk, Scan14 with printed brochures containing many photographs of HST and their first shots of the surrounding universe. In this letter he appreciated the shown interest in the problem of Hubble, congratulated the spirit of inquiry, and conveyed me the assurance of having detected perfectly the problem, a “spherical aberration” in the primary mirror, produced by the undergone deformation by excessive polishing.

I answered this letter with another, on 03/11/92 Scan15, which I feature essentially that, if once corrected the spherical aberration, the focusing distortion disappears, this fact should be considered as conclusive proof of the nonexistence of ether, and in a more conclusive form than the famous null result of the M-M experiment. (I include in this letter the parameters of the HST optical system, estimated from the brochures received, which, together with the orbit ones, allowed me to deduce that, in case ether exists, the focus point would be describing every 96 minutes a circle radius 0.365 mm, in a plane parallel to its orbit one).This letter was answered this time by Robert V. Stachnik, Senior Staff Scientist, Astrophysics Division, dated 18/11/92, again thanking my interest, and ensuring that the problem was well established and its solution. Scan16
We all know that the following year, at the end of 93, the mission with the shuttle Endeavour, was able to successfully correct this problem, providing from then the amazing Hubble images for their sharpness and resolution, and continually making interesting discoveries.

The Astronomical Test for the 2nd Postulate of the Special Theory of Relativity

Paper presented at the Congress of Physics AFA 2003

Smooth operation of the Hubble is for me a clear proof of the nonexistence of ether, as I said in my second letter to NASA Scan15, so, regardless of whether this was a widely acknowledged fact, cleared of my mind its possible existence, devoting myself again to find a way to avoid the problem of **light reemission** -as postulates J. G. Fox in their mentioned papers of the 60s - in my imagined experiments.

The **reemission of light** is a complex mechanism, due to its electron scattering in a material medium, in whose explanation are involved several authors with their theories, such as Born, Wolf, Rosenfeld, Ewald, Oseen, etc.., with a result simple and "explosive": **a beam of light**

passing through or being reflected in a dielectric, it always does with the characteristic speed *c* , thus canceling out any possible difference with it the incident beam might have.

Meditating on how to avoid this inconvenience I considered tackling the problem in a completely different way: I thought that the Stellar Aberration phenomenon, discovered and explained by J. Bradley in 1728 (J. Bradley, Phil. Trans. Roy. Soc London 35 (1728) 637) is a fact quite interesting and suitable to test the constancy of *c* , since, as we know, in this phenomenon is composed the speed of light *c* from a star-or any other celestial body- with the one of the movement of the Earth or a space telescope, *v*, to give us a different declination angle to the real (hence the name *aberration*) and variable according to the star position on the celestial sphere and the time of year when we observe it.
This composition would take place, actually, in the first air layers of Earth's atmosphere, thick defined by the Extinction Theorem of Ewald and Oseen (M.Born & E.Wolf, Principles of Optics, Pergamon Press, N. York , 1959, p.70)), or in the main lens of a space telescope to observe the star in question. But the reemission in these dielectrics not poses now a problem for our test, being just the dielectric the place where the light from the star can compose its speed with the one of such dielectric, ie the observer one. And this light travels through empty space, and, therefore, its speed could itself have a different value than its *c* characteristic, in case to be affected by the speed of the star that emits it, and give different aberration angles for stars with different radial speeds.

As it can be inferred, the test consists of the systematic measurement at different times of the year, of the aberration angles of stars with known and different radial velocities, and, if possible, visually nearby, and verify if their aberration angles differ or, as Relativity provides, are the same for all cases.

As we know, the maximum value of this angle is $\alpha = \text{arc tg } v/c$, where *v* is the tangential velocity of our planet in its course around the sun, and *c* the speed of light in vacuum. The point of this test is that if *c* can take a different value of its, simplifying, 300 000 km/s, then α also will vary. Let us see how accurately we should make observations of selected stars to appreciate differences in these declination angles..

To conceptualize the magnitudes I put the same example of the work sent to AFA 2003 Doc3, p.7, and also of the publication in APEIRON Doc4, pag.248: Let *c* = 300 000 km/s and *v* = 30 km/sec. We know that for very small angles, these are virtually identical to their tangents, then, expressing α in degrees, $\alpha = 30/300.000 \times 360\,°/2\pi = 20.626"$.
(The generally accepted value for this maximum aberration is α = 20.48 ").
Let's see what the values would take α in the case of a star with radial velocity +300 km/sec and another one with -60 km/sec, and that these velocities are subtracted and added respectively to the light one: $\alpha' = 30/299.700 \times 360°/2\pi = 20.647"$ and $\alpha" = 30/300.060 \times 360°/2\pi = 20.622"$. The difference between these two positions would then be 0.025".
In the cited publications I'm demonstrating that the maximum separation of these two positions, registered with 6 months difference between them is twice the difference of their maximum aberrations. For this example we would then have a telescope to an accuracy of 0.05 "(5 hundredths of a second, or half a tenth of a second).
The example above is very realistic; the involved magnitudes are not extraordinary, existing greater radial velocities even in stars and, above all, in galaxies or clusters of galaxies. The question is what order of magnitude and brightness must have these heavenly bodies to be elected at the completion of the test. It is undoubtedly a task of astronomers specialized in

Astrometry. More details and considerations on the test appear in the texts of the mentioned papers.

I sent the text of this test proposal to my friend, Dr. José Astigueta, then working in CNEA (National Commission of Atomic Energy) and teaching in Instituto Balseiro, who suggested me to submit it at a congress of Physics to be held next (September 2003) in Bariloche, the AFA (Argentine Physics Association) 2003, which I did, sending Doc3 work, and once accepted, moving to that city and displaying it in the congress, in the form of a poster with a summary of the test. (Scan17 and Scan18). (I leave here clarified that their support does not imply agreement with the ideas expressed in the work) While the writing was on the index of the papers, with their titles, authors and abstracts, the intervener referee did not authorize subsequent full publication in the Annals of Congress.
The arguments used by the referee to recommend the non publication of the work clearly show the impediments that mean prejudice and paradigm adherence to the emergence of new concepts in science, bordering here the medieval obscurantism suffered by Giordano Bruno, Copernicus, Galileo Galilei, etc.. (without the unfortunate consequences for me, at least so far, that they suffered).
He did not judge the effectiveness and feasibility of the test but could not stand my conceptual questionings to the Theory of Relativity. I suggest the reader a look at its recommendation Scan19, as well as my appeal to this Scan20, and the response of the editors Scan21.

"An Astronomical Test for the Second Postulate of the Special Theory of Relativity"

I also unsuccessful in my attempt to publish the English version in the journals "Nature" (Email14) and "American Journal of Physics" (Email15). Then my friend suggested me to send the proposal test to his old friend, Professor of Physics, University of Comahue, and a permanent member of the Academy of Sciences of New York, Dr. Jorge Guala-Valverde, author of numerous publications and laboratory essays based on homopolar electrodynamic and old detractor of the Theory of Relativity.I received a warm praise from him, and his recommending Email1 to send the work to Canadian journal APEIRON http://www.redshift.vif.com, considering it open-minded to new currents of thought without losing the scientific rigor of a serious magazine Email2. (This magazine has recently suspended indefinitely their issues, but keeps their files of 25 year publications). I express my gratitude to Prof. Guala-Valverde, and my tribute to him, to have recently learned of his death in 2009.
After several comings and goings of the English text with the editor of the magazine for language issues (finally I needed the help of a polished by my niece Cecilia Fosser and her husband, Craig Hyde, both doctors in Mathematics, Americans and residents in Connecticut) and some cuts in the text suggested by the designated referee, finally the work saw the light in a scientific journal in the April 2005 volume of Apeiron Doc4.

"A Test in the Outer Space for the Constancy of the Velocity of Light"

In July 2010 I published again in Apeiron this another project of test, Doc5 far more complex than the previous one, since require an airless environment mounting, the surface of the Moon or a spacecraft, and consisting of a rotating mirror that deflects the light beams of two stars of different radial velocities, which could also be the components of a visual double star. Actually, this experiment is only one version of my second submission to the RAE, with the drawback saved of the reemission of light, as it unfolds in a vacuum, and the images of the

chosen stars are captured by intermittent window without any disturbing dielectric. It is more accurate than the measurement of the aberration angles but also more complicated and costly. His execution would surely have a favorable response only after a positive result of the other one.

Pushing the realization of the Test

Circular to Astronómical Observatories

While see published my ideas and proposals -which also had the approval and accession of Prof. Reginald Cahill, Flinders University, Adelaide (Australia) -Email3, fairly appeased my restlessness entrained in so many years, something like the quiet of mission accomplished, with the passage of time I felt this was not enough, that I would have to somehow push the realization of the test. Commenting on this with my friend Silvio Barone, Sao Paulo (Brazil), it was he who urged me to write a circular to various astronomical observatories, presenting the proposal. I made them in Spanish Email4 and English Email5, as appropriate. After searching the Internet observatories I considered capable of performing the test, I sent these circulars in late 2009 to the Asociación Ecuatoriana de Astronomía, to the Instituto de Astrofísica de Canarias, the Observatorio Astronómico de Mallorca, to the Gran Telescopio de Canarias, to Observatorio Interamericano Cerro Tololo, Chile, (operated by the Association of Universities for Ressearch in Astronomy), and to the European Space Agency (ESA).

The SIM NASA Project

From none of the above observatories I received a reply, but ESA did with a note telling me different type of formal ways I could choose to communicate with them.
I did not know what was appropriate, so I did not insist. Email6
But just at that time the Astronomer Dr. Felix Mirabel (we have a political kinship), a IAFE (Institute of Astronomy and Physics Space) and CONICET researcher, and of the Atomic Energy Commission of France, learned my publication and sent it to a colleague, Dr. Rafael Ferraro, a specialist in relativity and alternative theories.
Dr. Ferraro, although disagreed, praised my work and gave me the NASA SIM group link, based at the Jet Propulsion Laboratory in Pasadena, the same in which Prof. Carl Sagan worked with their interplanetary-exploration projects, understanding that they would have in the near future the very high precision instrumental to make the required measurements in my test.
I then sent my circular and was surprised by the quick response of the project director himself, Dr. James Marr. Email7
The SIM project is a satellite for precision astrometry using Michelson-Morley type interferometers, with tentative launch date, by then, the ending of 2015. Although I involved in theoretical discussions with his Relativity specialist, Dr. Slava Turyshev, the conclusion was that my proposal would be taken into account in this mission, among several other tests related to RT. Email8 and Email9.
Unfortunately, this project was abandoned in 2010 for budgetary reasons, I suppose, and reassigned their roster. I learned of this dissolution while trying to send them my latest published project, "A Test in the Outer Space ..."

The ESA GAIA Project

By then I learned about the GAIA project of ESA http://www.rssd.esa.int/GAIA, and to it I turned my guns again. With this project -the current tentative launch date, after several postponements, November 20, 2013 (see updating in the GAIA portal) – they will put a satellite of advanced astrometry (3D call them, more ambitious, I understand, that the SIM NASA one), including among the parameters to measure the radial velocity of the stars, key element for my test.
While it appears that I didn't direct my request to the agency appropriate division, one of its directors, Dr. Timo Prusti, was kind in answering (April 2011) that timely, with the collection of data from the mission, my proposal would be evaluated. But emphasizing, according I understood, in the convenience to choose the right communication channels. Email10, Email11 and Email12.

The Observatorio Astronómico Felix Afuilar

This means, roughly, wait 2 to 3 years a posteriori launch. Would I then sit idly by waiting for the facts give, besides the good will of the people of GAIA to analyze the results, or the publication of the corresponding catalog to do myself the analysis?
As the answer was "no", and the required accuracy in determining the position of celestial bodies in my proposed test is about 0.05 "(5 hundredths of a second), is that I didn't consider necessary to wait so long for an accuracy so high as the expected to provide the GAIA project observations, (hundreds of times greater. So I decided to offer to perform the test to Observatorio Astronómico Félix Aguilar (OAFA), of the Universidad Nacional de San Juan, Argentina http://www.oafa.fcefn.unsj-cuim.edu.ar/OafaNew/Index.htm,, whose meridian telescope in El Leoncito has the mentioned accuracy of 0.05 ". My reasoning was hat, performing the test with this precision and with the current registered values of the selected stars radial velocities, an eventual positive outcome -although not very accurate- certainly would open the door to a planned and precise observation of the team of GAIA.

To that end, I wrote to Mr. Cornudella -the communication channel offered in the Internet portal of the observatory, in March 2011, and not receiving any response, at Area Meridiana staff research, with a copy to the observatory director, Dr. Esther Alonso, in the following April, Email13 with the same negative result: total ignorance of my uneasiness.

Buenos Aires, October 24, 2013

"A Test to the Constancy of the Velocity of Light with our Solar System"
In October 2023, I published this article in Physics Essays, Doc6. The reasons for this new test proposal are explained in the Introduction of the article.